Calculus 1 Workbook

Derivative rules

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MATH

POWER RULE

1. Find the derivative of $f(x) = 7x^3 - 17x^2 + 51x - 25$ using the power rule.

2. Find the derivative of $g(x) = 2x^4 + 8x^3 + 6x^2 - 32x + 16$ using the power rule.

3. Find the derivative of $h(x) = 22x^3 - 19x^2 + 13x - 17$ using the power rule.

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POWER RULE FOR NEGATIVE POWERS OR POWERS IN THE DENOMINATOR

■ 1. Find the derivative of the function using the power rule.

$$f(x) = \frac{7}{x^2} - \frac{5}{x^4} + \frac{2}{x}$$

■ 2. Find the derivative of the function using the power rule.

$$g(x) = \frac{1}{9x^4} + \frac{2}{3x^5} - \frac{1}{x}$$

■ 3. Find the derivative of the function using the power rule.

$$h(x) = -\frac{7}{6x^6} - \frac{1}{4x^4} + \frac{9}{2x^2}$$

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POWER RULE FOR FRACTIONAL POWER OR RADICALS

■ 1. Find the derivative of the function using the power rule.

$f(x) = 4x^{\frac{3}{2}} - 6x^{\frac{5}{3}}$

■ 2. Find the derivative of the function using the power rule.

$g(x) = 6x^{\sqrt{3}} - 4x^{\sqrt{5}}$

■ 3. Find the derivative of the function using the power rule.

$h(x) = \frac{1}{3}x^{\frac{6}{5}} + \frac{1}{4}x^{\frac{8}{3}} - \frac{1}{5}x^{\frac{5}{2}}$

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PRODUCT RULE, TWO FUNCTIONS

■ 1. Use the product rule to find the derivative of the function.

$h(x) = (3x + 5)\ln(5x)$

■ 2. Use the product rule to find the derivative of the function.

$h(x) = 8x^3e^{7x}$

■ 3. Use the product rule to find the derivative of the function.

$h(x) = (5x^2 - x)(e^{4x} - 6)$

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PRODUCT RULE, THREE OR MORE FUNCTIONS

■ 1. Use the product rule to find the derivative of the function.

$y = 5x^4e^{3x}\cos(6x)$

■ 2. Use the product rule to find the derivative of the function.

$y = (-6x^2)(-2e^{5x})\tan(5x)$

■ 3. Use the product rule to find the derivative of the function.

$y = (\sin(7x))(7e^{4x})(2x^6 + 1)$

■ 4. Use the product rule to find the derivative of the function.

$y = (\cos(3x))(\sin(2x))(\tan(5x))(e^{2x})$

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QUOTIENT RULE

■ 1. Use the quotient rule to find the derivative of the function.

$$h(x) = \frac{2x + 6}{7x + 5}$$

■ 2. Use the quotient rule to find the derivative of the function.

$$h(x) = \frac{5x - 3}{4x - 9}$$

■ 3. Use the quotient rule to find the derivative of the function.

$$h(x) = \frac{-8x}{5x + 2}$$

■ 4. Use the quotient rule to find the derivative of the function.

$$h(x) = \frac{3x^2 + 12x}{e^x}$$

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RECIPROCAL RULE

■ 1. Use the reciprocal rule to find the derivative of the function.

$$h(x) = \frac{6}{x-1} - \frac{2}{5x}$$

■ 2. Use the reciprocal rule to find the derivative of the function.

$$h(x) = \frac{3}{2x+3} + \frac{4}{2x-7}$$

■ 3. Use the reciprocal rule to find the derivative of the function.

$$h(x) = \frac{5}{9x+5} + \frac{4}{3x+7}$$

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